Please insert the following paragraph for the paragraph appearing at page 24, lines 10-16, with a marked-up copy of the amended paragraph appearing in an Appendix attached to this reply:

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The synthesis of the nano corundum powder resulted as described in example 1 with the following differences: (1) highly pure aluminum nitrate ($Al(NO_3)_3$, purity >99%), was used as inorganic raw material, (2) after aging for 3 days, the large proportion of the water was separated by centrifugation and the remaining gel-like bottom sediments were freeze dried, (3) commercial grade, highly pure Al_2O_3 grinding balls (purity >99.9%) were used for the dispersion grinding reduced to 3 h of the aqueous suspension of calcinated powder in a high-speed horizontal attrition ball mill.

IN THE CLAIMS

Please change "Claims" to ---What is claimed is:---

Please delete claims 1-23 without prejudice or disclaimer of the subject matter recited therein.

Please add claims 24-64, as follows:

Sub C1

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---24. A process for producing redispersible nanocorundum with an average particle size D_{50} < 100 nm with addition of nuclei that promote transformation to corundum in subsequent annealing, comprising:

(a) dissolving in a liquid medium or processing in a liquid medium to a sol, as starting materials, chlorine-free inorganic precursors;

(b) hydrolyzing the solution or the sol of (a) through the addition of a base in a mole ratio of base:precursor of 1 to 3;

(c) aging the hydrolyzed solution or sol of (b) at temperatures between 60 and 98°C for 1 to 72 hours;

(d) subsequently drying the aged solution or sol of (c) followed by calcination at temperatures between 350 and 650°C for converting hydrolyzed precursor into a semiamorphous intermediate phase and ultimately into transitional aluminum oxides; and

(e) performing further annealing by increasing temperature to ≤ 950°C for converting product of (d) into corundum phase.

25. The process according to claim 24 wherein the calcination of (d) is carried out at temperatures of 400 to 600°C for 0.5 to 2 hours, and the further annealing of (e) for formation of corundum is carried out by a temperature increase to 650 - 900°C for 0.5 to 1 hours.

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26. The process according to claim 24 wherein at least one of the transitional aluminum oxides and corundum are ground.

27. The process according to claim 26 wherein the grinding of the at least one of the transitional aluminum oxides and corundum is carried out in an organic liquid.

28. The process according to claim 24 wherein after the aging of the hydrolyzed solution or sol, a gel formation or a liquid shaping is carried out, subsequently the drying, calcination and annealing take place and after the annealing a sintering is carried out at temperatures above the corundum formation temperature.

29. A process for producing redispersible nanocorundum with an average particle size $D_{50} < 100$ nm with addition of nuclei that promote transformation to corundum in subsequent annealing, comprising:

(a) dissolving in a liquid medium or processing in a liquid medium to a sol, as starting materials, organic precursors;

(b) hydrolyzing either (i) with excess water through addition of the precursor solution or the precursor sol of (a) to water at a mole ratio of water:precursor > 3, and with addition of an acid that leads to pH = 3-5, or (ii) through addition of an amount of water restricted to a mole ratio of water:precursor ≤ 3 to the precursor solution or precursor sol of (a) that are to be mixed with complex-forming ligands;

(c) aging the hydrolyzed solution or sol of (b) at temperatures of ≤ 50°C within 5 hours, and subsequently aging at temperatures of 80 to 98°C within 1 to 24 hours;

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(d) subsequently drying the aged solution or sol of (c) followed by calcination at temperatures between 350 and 650°C for converting the hydrolyzed precursor into a semiamorphous intermediate phase and then to transitional aluminum oxides; and

(e) performing further annealing by increasing temperature to ≤950°C for converting product of (d) into corundum phase.

30. The process according to claim 29, wherein the calcination of (d) is carried out at temperatures of 400 to 600°C for 0.5 to 2 hours, and the further annealing of (e) for formation of corundum is carried out by a temperature increase to 650 - 900°C for 0.5 to 1 hours.

31. The process according to claim 29 wherein at least one of the transitional aluminum oxides and corundum are ground.

32. The process according to claim 31 wherein the grinding of the at least one of the transitional aluminum oxides and corundum is carried out in an organic liquid.

33. The process according to claim 29 wherein after the aging of the hydrolyzed solution or sol, a gel formation or a liquid shaping is carried out, subsequently the drying, calcination and annealing take place and after the annealing a sintering is carried out at temperatures above the corundum formation temperature.

34. Nanocorundum powders comprising a close particle size distribution in low nanometer range, comprising a narrow width of size distribution of isometrically formed particles $D_{84} < 150$ nm, less than 0.05% by weight chlorine, at least 60% α-aluminum oxide, and the powders are redispersible.

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35. A process for the production of sintered corundum products in a form of dense or porous compact bodies, layers or granulates, comprising sintering nanocorundum powders according to claim 34 at temperatures ≤ 1450°C to form granulate or sintered corundum bodies having an average grain size of ≤ 0.6 μm.

36. A process for coating a porous or dense metallic substrate wherein particles of the hydrolyzed sol or particles of a suspension of nanocorundum produced according to claim 24 are electrophoretically deposited on the metallic substrate, and subsequently subjected to annealing.

37. A process for coating a porous or dense metallic substrate wherein particles of the hydrolyzed sol or particles of a suspension of nanocorundum produced according to claim 29 are electrophoretically deposited on the metallic substrates, and subsequently subjected to annealing.

38. A process for the production of sintered porous or dense corundum layers wherein the aged the hydrolyzed solution or sol of (c) according to claim 24 is applied to a substrate and afterwards the drying, calcination and annealing are carried out.

39. The process according to claim 38 wherein after the aging of the solution or the sol, the material is deposited on a substrate with gel formation.

40. The process according to claim 38 wherein, after the annealing for coverting into the corundum phase, a sintering is carried out at temperatures above the corundum formation temperature.

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41. The process according to claim 38 wherein, after the annealing, at least one further coating and at least one further annealing is carried out.

42. A process for the production of sintered porous or dense corundum layers wherein the aged the hydrolyzed solution or sol of (c) according to claim 29 is applied to a substrate and afterwards the drying, calcination and annealing are carried out.

43. The process according to claim 42 wherein after the aging of the solution or the sol, the material is deposited on a substrate with gel formation.

44. The process according to claim 42 wherein, after the annealing for coverting into the corundum phase, a sintering is carried out at temperatures above the corundum formation temperature.

45. The process according to claim 42 wherein, after the annealing, at least one further coating and at least one further annealing is carried out.

46. Al_2O_3 sintered products, produced according to claim 28, wherein through annealing at 650 to 1250°C, there is a phase composition of more than 80% corundum and an average pore size of 10 - 100 nm with a porosity of ≥ 30% by volume.

47. Al_2O_3 sintered products, produced according to claim 38, wherein through annealing at 650 to 1250°C, there is a phase composition of more than 80% corundum and an average pore size of 10 - 100 nm with a porosity of ≥ 30% by volume.

48. Al_2O_3 sintered products, produced according to claim 42, wherein through annealing at 650 to 1250°C, there is a phase composition of more than 80% corundum and an average pore size of 10 - 100 nm with a porosity of ≥ 30% by volume.

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49. Dense sinter corundum layers, produced according to claim 24, on a materially different type of substrate, in which through sintering at a temperature of ≤ 1250°C there is an average grain size of ≤ 0.5 μm.

50. Dense sinter corundum layers, produced according to claim 29, on a materially different type of substrate, in which through sintering at a temperature of ≤ 1250°C there is an average grain size of ≤ 0.5 μm.

51. A process for producing nanoporous Al_2O_3 sintered products comprising:

(a) dissolving in a liquid medium or processing in a liquid medium to a sol, as starting materials, chlorine-free inorganic precursors;

(b) hydrolyzing the solution or the sol of (a) through the addition of a base in a mole ratio of base:precursor of 1 to 3;

(c) aging the hydrolyzed solution or sol of (b) at temperatures between 60 and 98° C for 1 to 72 hours; and

(d) subsequently drying followed by calcination at temperatures between 350 and 750°C for converting hydrolyzed precursors into aluminum oxide.

52. A process for production of nanoporous layers wherein the aged solution or the sol of (c) according to claim 51 is applied to a substrate and afterwards the drying and calcination are carried out.

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53. The process according to claim 52 wherein gel formation occurs upon application to a substrate.

54. The process according to claim 51 wherein nuclei of a transitional aluminum oxide are added to the solution or to the sol.

55. A process for coating a porous or dense metallic substrate, wherein particles of hydrolyzed sol or particles of a suspension of nano porous aluminum oxide according to claim 51 are electrophoretically deposited on the metallic substrate.

56. The process for coating porous or dense metallic substrates according to claim 55 wherein after the electrophoretic deposit of the particles, a heat treatment is carried out at temperatures of 350 - 750°C.

57. Nanoporous Al_2O_3 sintered products, produced according to claim 51 in which there is an average pore diameter in the range between 0.5 and 2.5 nm at a porosity of ≥30% by volume.

58. A process for producing nanoporous Al_2O_3 sintered products, comprising:

(a) dissolving in a liquid medium or processing in a liquid medium to a sol, as starting materials, organic precursors;

(b) hydrolyzing either (i) with excess water through addition of the precursor solution or the precursor sol of (a) to water at a mole ratio of water:precursor > 3, and with addition of an acid that leads to pH = 3-5, or (ii) through addition of an amount of water restricted to a mole ratio of water:precursor ≤ 3 to the precursor solution or precursor sol of (a) that are to be mixed with complex-forming ligands;

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(c) aging the hydrolyzed solution or sol of (b) at temperatures of ≤ 50°C within 5 hours, and subsequently aging at temperatures of 80 to 98°C within 1 to 24 hours; and

(d) subsequently drying the aged solution or sol of (c) followed by calcination at temperatures between 350 and 750°C for converting hydrolyzed precursors into aluminum oxide.

59. A process for production of nanoporous layers wherein the aged solution or the sol of (c) according to claim 58 is applied to a substrate and afterwards the drying and calcination are carried out.

60. The process according to claim 59 wherein gel formation occurs upon application to a substrate..

61. The process according to claim 58 wherein nuclei of a transitional aluminum oxide are added to the solution or to the sol.

62. A process for coating a porous or dense metallic substrate, wherein particles of hydrolyzed sol or particles of a suspension of nano porous aluminum oxide according to claim 58 are electrophoretically deposited on the metallic substrate.

63. The process for coating porous or dense metallic substrates according to claim 62 wherein after the electrophoretical deposit of the particles, a heat treatment is carried out at temperatures of 350 - 750°C.

64. Nanoporous Al_2O_3 sintered products, produced according to claim 58 in which there is an average pore diameter in the range between 0.5 and 2.5 nm at a porosity of ≥30% by volume.---

REMARKS

Entry of the foregoing amendment is respectfully requested prior to examination of the application.

Applicants respectfully note that, upon entry of the present amendment, claims 1-23 will be canceled, and claims 24-64 will be added, whereby claims 24-64 will be pending, with claims 24, 29, 34, 51 and 58 being independent claims.